CLAIMS

1. A method for driving a recording head having a plurality of heating elements as driving elements for ejecting ink droplets from a plurality of nozzles, the plurality of heating elements being arranged in a direction substantially perpendicular to the direction of carrying a carried recording medium, the method comprising:

a time-division driving step of dividing the plurality of heating elements into a plurality of blocks, each block consisting of a predetermined number of spatially arranged heating elements of the plurality of heating elements corresponding to the plurality of nozzles, and sequentially driving each set of heating elements simultaneously driven over the respective blocks, in a time-divisional manner; and

a recording step of ejecting ink droplets from the nozzles corresponding to the driven heating elements and impacting the ink droplets on the recording medium, thus recording dots made of the ink droplets.

2. The method for driving a recording head as claimed in claim 1, wherein at the time-division driving step, the heating elements are driven on the basis of a division dive signal generated for said each set and an element drive signal, which is a signal for driving the heating elements and is made up of necessary data for forming one dot.

3. The method for driving a recording head as claimed in claim 2, wherein at the time-division driving step, the division drive signals corresponding to the number of time divisions are generated by multi-dimensional input signals.

4. A recording head having a plurality of heating elements as driving elements for ejecting ink droplets from a plurality of nozzles, the plurality of heating elements being arranged in a direction substantially perpendicular to the direction of carrying a carried recording medium, the recording head comprising:

time-division driving means for dividing the plurality of heating elements into a plurality of blocks, each block consisting of a predetermined number of spatially arranged heating elements of the plurality of heating elements corresponding to the plurality of nozzles, and sequentially driving each set of heating elements simultaneously driven over the respective blocks, in a time-divisional manner; and

recording means for ejecting ink droplets from the nozzles corresponding to the driven heating elements and impacting the ink droplets on the recording medium, thus recording dots made of the ink droplets.

5. The recording head as claimed in claim 4, wherein the time-division driving means drives the heating elements on the basis of a division dive signal generated for said each set and an element drive signal, which is a signal for driving the heating elements and is made up of necessary data for forming one dot.

6. The recording head as claimed in claim 5, wherein the time-division driving means generates the division drive signals corresponding to the number of time divisions by multi-dimensional input signals.

7. An ink jet printer having a recording head having a plurality of heating elements as driving elements for ejecting ink droplets from a plurality of nozzles, the plurality

of heating elements being arranged in a direction substantially perpendicular to the direction of carrying a carried recording medium, the ink jet printer being adapted for recording information including a character and/or an image in the form of dots made of ink droplets, the ink jet printer comprising:

Sub a3

time-division driving means for dividing the plurality of heating elements into a plurality of blocks, each block consisting of a predetermined number of spatially arranged heating elements of the plurality of heating elements corresponding to the plurality of nozzles, and sequentially driving each set of heating elements simultaneously driven over the respective blocks, in a time-divisional manner; and

recording means for ejecting ink droplets from the nozzles corresponding to the driven heating elements and impacting the ink droplets on the recording medium, thus recording dots made of the ink droplets.

8. The ink jet printer as claimed in claim 7, wherein the time-division driving means drives the heating elements on the basis of a division dive signal generated for said each set and an element drive signal, which is a signal for driving the heating elements and is made up of necessary data for forming one dot.

9. The ink jet printer as claimed in claim 8, wherein the time-division driving means generates the division drive signals corresponding to the number of time divisions by multi-dimensional input signals.

Sub a4

10. A method for driving a recording head having a plurality of heating elements as driving elements for ejecting ink droplets from a plurality of nozzles, the plurality

of heating elements being arranged in a direction substantially perpendicular to the direction of carrying a carried recording medium, the method comprising:

a drive signal generating step of generating an element drive signal made of necessary data for forming one dot so as to modulate the diameter of a dot by the number of ink droplets, using one or a plurality of ink droplets for forming one dot;

a time-division driving step of dividing the plurality of heating elements into a plurality of blocks, each block consisting of a predetermined number of spatially arranged heating elements of the plurality of heating elements corresponding to the plurality of nozzles, and sequentially driving each set of heating elements simultaneously driven over the respective blocks, in a time-divisional manner; and

a recording step of ejecting one or a plurality of ink droplets from the nozzles corresponding to the driven heating elements and impacting the ink droplet(s) on the recording medium, thus recording dots made of the ink droplet(s).

11. The method for driving a recording head as claimed in claim 10, wherein at the time-division driving step, the heating elements are driven on the basis of a division dive signal generated for said each set and an element drive signal generated at the drive signal generating step for driving the heating elements belonging to said set designated by the division drive signal.

12. The method for driving a recording head as claimed in claim 10, wherein at the drive signal generating step, record data made up of necessary data for forming one dot is compared with the number of pulses generated for determining the number of

said ink droplets to be ejected from the nozzles, and the result of comparison is outputted as the element drive signal.

13. The method for driving a recording head as claimed in claim 12, wherein at the drive signal generating step, the order of the pulses to be objects of comparison with the record data is determined so that a dot to be formed on the recording medium is equivalent to a dot formed by distributing the ink droplets in the direction of carrying the recording medium from a lattice point as the center, which is the position on the recording medium in forming one dot with one said ink droplet.

14. The method for driving a recording head as claimed in claim 13, wherein at the drive signal generating step,

in the case of forming one dot with the ink droplets of even ordinal numbers, the order of the pulses to be objects of comparison with the record data is determined so that the resultant dot is equivalent to a dot formed by distributing the ink droplets of odd ordinal numbers and the ink droplets of even ordinal numbers in the direction of carrying the recording medium symmetrically about the lattice point as the center, and

in the case of forming one dot with the ink droplets of odd ordinal numbers, the order of the pulses to be objects of comparison with the record data is determined so that the resultant dot is equivalent to a dot formed by impacting the first ink droplet on the lattice point and then distributing the ink droplets of odd ordinal numbers and the ink droplets of even ordinal numbers in the direction of carrying the recording

medium symmetrically about the lattice point as the center.

15. The method for driving a recording head as claimed in claim 13, wherein at the recording step, recording is carried out while the position on the recording medium where the ink droplet should be impacted is changed in accordance with the number of pulses generated at the drive signal generating step.

16. The method for driving a recording head as claimed in claim 12, wherein at the drive signal generating step, the record data is temporally divided into two, and the order of the pulses to be objects of comparison with the former half record data of the record data divided into two is determined so that a dot to be formed on the recording medium is equivalent to a dot formed by distributing the ink droplets in the direction of carrying the recording medium from a lattice point as the center, which is the position on the recording medium in forming one dot with one said ink droplet.

17. The method for driving a recording head as claimed in claim 16, wherein at the drive signal generating step, the order of the pulses to be objects of comparison with the latter half record data is determined so that record data based on the pulses of odd ordinal numbers and record data based the pulses of even ordinal numbers are arranged on the opposite sides of the lattice point to the former half record data.

18. The method for driving a recording head as claimed in claim 11, wherein at the time-division driving step, the division drive signals corresponding to the number of time divisions are generated by multi-dimensional input signals.

19. A recording head having a plurality of heating elements as driving elements for

ejecting ink droplets from a plurality of nozzles, the plurality of heating elements being arranged in a direction substantially perpendicular to the direction of carrying a carried recording medium, the recording head comprising:

drive signal generating means for generating an element drive signal made of necessary data for forming one dot so as to modulate the diameter of a dot by the number of ink droplets, using one or a plurality of ink droplets for forming one dot;

time-division driving means for dividing the plurality of heating elements into a plurality of blocks, each block consisting of a predetermined number of spatially arranged heating elements of the plurality of heating elements corresponding to the plurality of nozzles, and sequentially driving each set of heating elements simultaneously driven over the respective blocks, in a time-divisional manner; and

recording means for ejecting one or a plurality of ink droplets from the nozzles corresponding to the driven heating elements and impacting the ink droplet(s) on the recording medium, thus recording dots made of the ink droplet(s).

20. The recording head as claimed in claim 19, wherein the time-division driving means drives the heating elements on the basis of a division dive signal generated for said each set and an element drive signal generated by the drive signal generating means for driving the heating elements belonging to said set designated by the division drive signal.

21. The recording head as claimed in claim 19, wherein the drive signal generating means has:

storage means for storing record data made up of necessary data for forming one dot;

pulse generating means for generating pulses for determining the number of said ink droplets to be ejected from the nozzles; and

comparing means for comparing the record data stored in the storage means with the number of pulses generated by the pulse generating means;

the drive signal generating means outputting the result of comparison made by the comparing means as the element drive signal.

22. The recording head as claimed in claim 21, wherein the drive signal generating means determines the order of the pulses to be objects of comparison with the record data so that a dot to be formed on the recording medium is equivalent to a dot formed by distributing the ink droplets in the direction of carrying the recording medium from a lattice point as the center, which is the position on the recording medium in forming one dot with one said ink droplet.

23. The recording head as claimed in claim 22, wherein in the case of forming one dot with the ink droplets of even ordinal numbers, the drive signal generating means determines the order of the pulses to be objects of comparison with the record data so that the resultant dot is equivalent to a dot formed by distributing the ink droplets of odd ordinal numbers and the ink droplets of even ordinal numbers in the direction of carrying the recording medium symmetrically about the lattice point as the center, and

in the case of forming one dot with the ink droplets of odd ordinal numbers, the drive signal generating means determines the order of the pulses to be objects of comparison with the record data so that the resultant dot is equivalent to a dot formed by impacting the first ink droplet on the lattice point and then distributing the ink droplets of odd ordinal numbers and the ink droplets of even ordinal numbers in the direction of carrying the recording medium symmetrically about the lattice point as the center.

24. The recording head as claimed in claim 22, wherein the recording means carries out recording while changing the position on the recording medium where the ink droplet should be impacted, in accordance with the number of pulses generated by the drive signal generating means.

25. The recording head as claimed in claim 21, wherein the drive signal generating means temporally divides the record data is temporally divided into two and determines the order of the pulses to be objects of comparison with the former half record data of the record data divided into two so that a dot to be formed on the recording medium is equivalent to a dot formed by distributing the ink droplets in the direction of carrying the recording medium from a lattice point as the center, which is the position on the recording medium in forming one dot with one said ink droplet.

26. The recording head as claimed in claim 25, wherein the drive signal generating means determines the order of the pulses to be objects of comparison with the latter half record data so that record data based on the pulses of odd ordinal numbers and

record data based the pulses of even ordinal numbers are arranged on the opposite sides of the lattice point to the former half record data.

27. The recording head as claimed in claim 20, wherein the time-division driving means generates the division drive signals corresponding to the number of time divisions by multi-dimensional input signals.

28. An ink jet printer having a recording head having a plurality of heating elements as driving elements for ejecting ink droplets from a plurality of nozzles, the plurality of heating elements being arranged in a direction substantially perpendicular to the direction of carrying a carried recording medium, the ink jet printer being adapted for recording information including a character and/or an image in the form of dots made of ink droplets, the ink jet printer comprising:

drive signal generating means for generating an element drive signal made of necessary data for forming one dot so as to modulate the diameter of a dot by the number of ink droplets, using one or a plurality of ink droplets for forming one dot;

time-division driving means for dividing the plurality of heating elements into a plurality of blocks, each block consisting of a predetermined number of spatially arranged heating elements of the plurality of heating elements corresponding to the plurality of nozzles, and sequentially driving each set of heating elements simultaneously driven over the respective blocks, in a time-divisional manner; and

recording means of ejecting one or a plurality of ink droplets from the nozzles corresponding to the driven heating elements and impacting the ink droplet(s) on the

recording medium, thus recording dots made of the ink droplet(s).

29. The ink jet printer as claimed in claim 28, wherein the time-division driving means drives the heating elements on the basis of a division dive signal generated for said each set and an element drive signal generated by the drive signal generating means for driving the heating elements belonging to said set designated by the division drive signal.

30. The ink jet printer as claimed in claim 28, wherein the drive signal generating means has:

storage means for storing record data made up of necessary data for forming one dot;

pulse generating means for generating pulses for determining the number of said ink droplets to be ejected from the nozzles; and

comparing means for comparing the record data stored in the storage means with the number of pulses generated by the pulse generating means;

the drive signal generating means outputting the result of comparison made by the comparing means as the element drive signal.

31. The ink jet printer as claimed in claim 30, wherein the drive signal generating means determines the order of the pulses to be objects of comparison with the record data so that a dot to be formed on the recording medium is equivalent to a dot formed by distributing the ink droplets in the direction of carrying the recording medium from a lattice point as the center, which is the position on the recording medium in forming

one dot with one said ink droplet.

32. The ink jet printer as claimed in claim 31, wherein in the case of forming one dot with the ink droplets of even ordinal numbers, the drive signal generating means determines the order of the pulses to be objects of comparison with the record data so that the resultant dot is equivalent to a dot formed by distributing the ink droplets of odd ordinal numbers and the ink droplets of even ordinal numbers in the direction of carrying the recording medium symmetrically about the lattice point as the center, and

in the case of forming one dot with the ink droplets of odd ordinal numbers, the drive signal generating means determines the order of the pulses to be objects of comparison with the record data so that the resultant dot is equivalent to a dot formed by impacting the first ink droplet on the lattice point and then distributing the ink droplets of odd ordinal numbers and the ink droplets of even ordinal numbers in the direction of carrying the recording medium symmetrically about the lattice point as the center.

33. The ink jet printer as claimed in claim 31, wherein the recording means carries out recording while changing the position on the recording medium where the ink droplet should be impacted, in accordance with the number of pulses generated by the drive signal generating means.

34. The ink jet printer as claimed in claim 30, wherein the drive signal generating means temporally divides the record data is temporally divided into two and

Sub a9

determines the order of the pulses to be objects of comparison with the former half record data of the record data divided into two so that a dot to be formed on the recording medium is equivalent to a dot formed by distributing the ink droplets in the direction of carrying the recording medium from a lattice point as the center, which is the position on the recording medium in forming one dot with one said ink droplet.

35. The ink jet printer as claimed in claim 34, wherein the drive signal generating means determines the order of the pulses to be objects of comparison with the latter half record data so that record data based on the pulses of odd ordinal numbers and record data based the pulses of even ordinal numbers are arranged on the opposite sides of the lattice point to the former half record data.

36. The ink jet printer as claimed in claim 29, wherein the time-division driving means generates the division drive signals corresponding to the number of time divisions by multi-dimensional input signals.